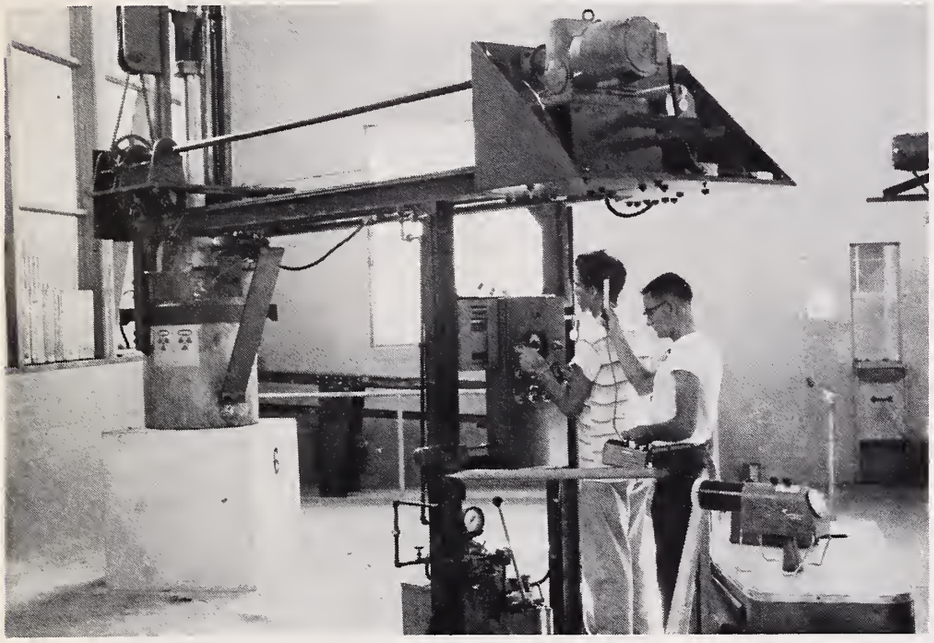
Atoms vs. the Screwworm No. 2
Progress report



N-30232-Irradiation of screwworm pupae in this cobalt-60 unit makes emerging flies sterile, but otherwise normal. Tests have shown that sterile males compete successfully with native screwworm flies in mating with females.

Efforts to eradicate the screwworm—an insect pest that causes livestock losses averaging $20 million a year in the southeastern United States--are moving ahead on schedule. The program began July 11, 1958 with U. S. Department of Agriculture and the southeastern States cooperating.

Sterile screwworm flies—the key to the effort--are being reared, sterilized with radiant energy from cobalt-60, and released by air over the infested area. In 1958, flies were released over an area of 80,000 square miles in Florida, southern Georgia, and southeastern Alabama. This required a production rate of 50 million sterile flies per week.

Infestations have been confined almost entirely to southeastern Florida since December 1, 1958. The release of sterile flies plus winter weather have reduced screwworm populations in Florida and have apparently eliminated infestations in the other two States.

While screwworm populations are low in Florida and appearing in only limited areas there, it is important to use every measure to eliminate infestations, campaign officials say. The rate of release of sterile flies has been stepped up in Florida to further reduce the native fly population before warming weather favors seasonal migration of the insect. Livestock owners are asked to report screwworm cases and to treat infestations promptly with permitted smears such as EQ-62 or EQ-335 or the insecticide CO-RAL.

The eradication program is based on years of research by entomologists of USDA's Agricultural Research Service, who found that pupae of the screwworm exposed to the proper amount of radiation produce sterile flies. This led to the plan of using laboratory-reared and sterilized flies to reduce the population of the screwworms and eventually to eliminate the pest from infested areas. Tests showed that when native females mate with sterile males, they produce eggs that do not hatch. Mass liberation of sterile flies by air, at carefully timed intervals, eradicated the pest from the Caribbean island of Curacao in 1954. Tests in the vicinity of Orlando, Florida, in 1956-57 also gave promising results.

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N - 28623 - Airplane hangar 160 x 200 feet in size has been converted to a fully mechanized "assembly-line" type of mass-rearing screwworm plant at Sebring, Florida. All operations are synchronized to the life cycle of the screwworm.

Fly

Eggs

Larvae

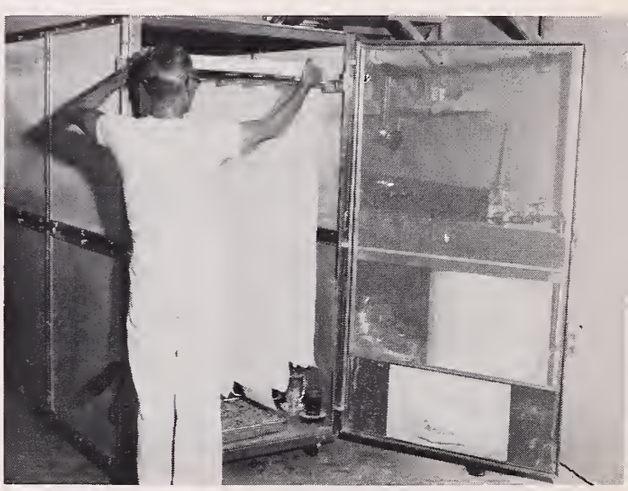
Pupae

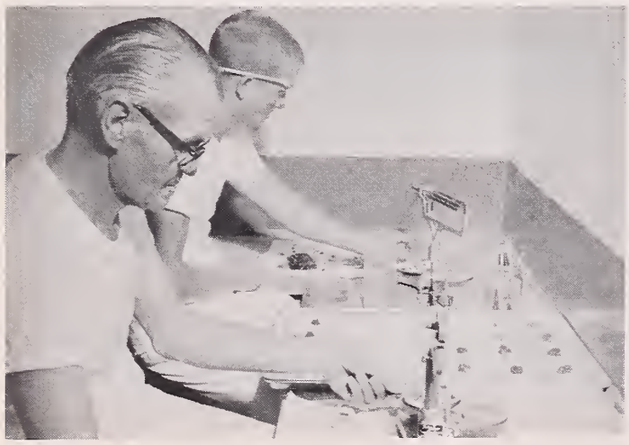
The screwworm fly (Bn 4384) is bluish-green in color and about twice the size of a housefly. The female lays about 250 eggs (Bn 4375) at a time on wounds of warmblooded animals. Larvae (Bn 1416) hatch from eggs and feed on animal, eventually killing it, if untreated. Grown larvae drop to the ground, burrow in the soil and change to pupae (Bn 4380). Flies emerge from pupal cases and come to the surface. The average life cycle takes about 21 days.

N - 28631 - Mass rearing, of screwworm flies begins here. Attendant readies a large screened cage for a fly colony. Fertile flies are induced to lay eggs on heated tray of ground meat in bottom of cage. Paper strips are hung for flies to rest on.

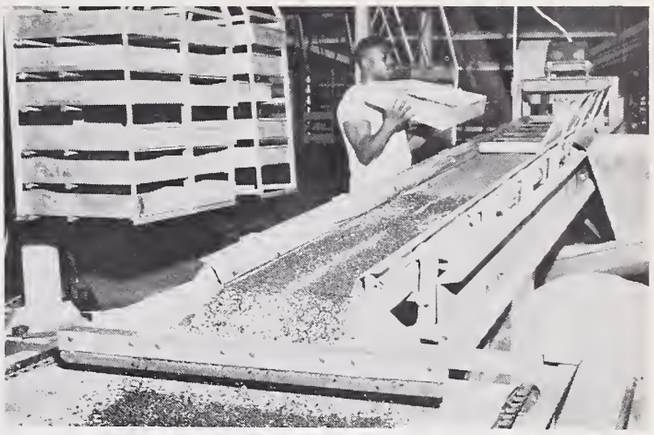
N - 28635 - Five-gram lots of screwworm eggs (about 100,000) are weighed, placed on small piece of ground meat in covered dishes, and held in a hatching room. In about 16 hours larvae hatch and are ready to start new cultures.

N - 30242 - Larvae are reared on meat, citrated blood and water in shallow, heated trays - - 3 per rack. The racks of trays travel for 5½ days on a powered monorail. As the larvae mature they crawl over the edge of trays and drop through metal grating in floor.

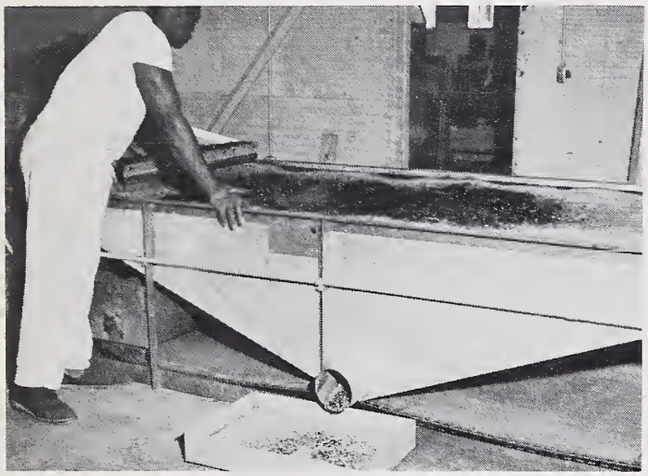




N-30257-Large metal hoppers beneath grates collect screwworm larvae and funnel them into sand trays on the lower floor. Moving on a conveyor belt, each tray catches about 18,000 larvae. Trays of larvae are then placed on racks hung from a powered monorail.

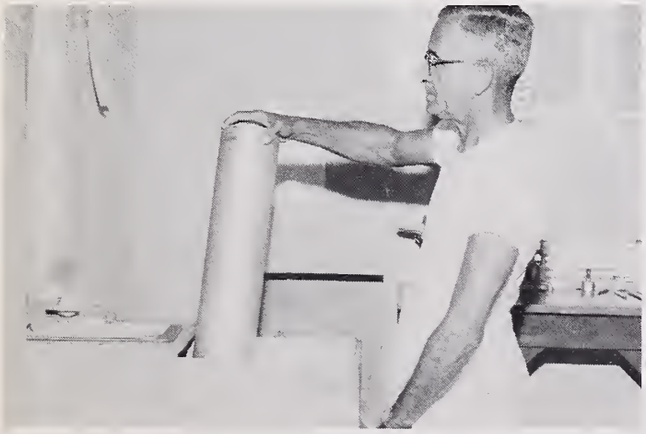


N-30246-Larvae burrow in sand and pupate during an 8-hour ride. As the racks of trays reach the sifter, an attendant dumps trays upon the sifter to separate pupae from sand.



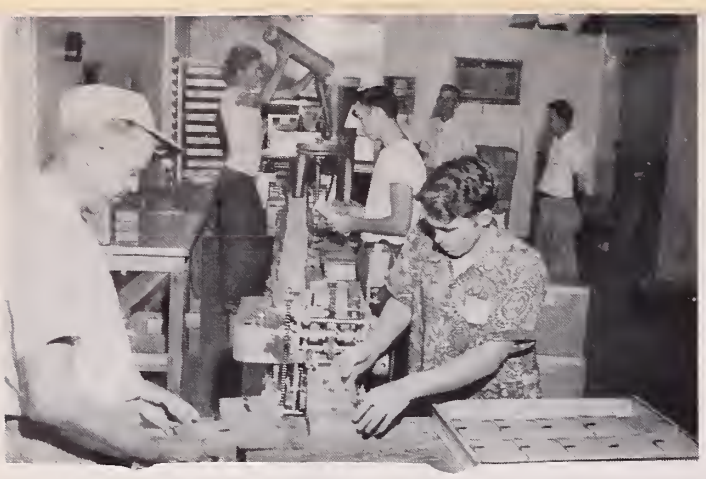
N-30252-Pupae are then screened from remaining larvae. The larvae wriggle through the coarser screen and are funneled back into sand trays for another ride to complete pupation.

N-30250-Trays of 18,000 screwworm pupae are dated and stacked in racks hung from monorail. A 5½ day ride in a dark room held at 80°F. and 95 percent humidity readies them for irradiation. Here attendant examines color of pupae which change from light red to black as they mature.



N-30261-Screwworm pupae in metal canisters are transferred to the cobalt-60 room for irradiation. The canisters are passed through a safety drawer heated to 120°F. to kill any fertile flies that may have emerged.

N-28626-This building 32 x 76 feet houses the 6 cobalt-60 irradiation units. A minimum of 50 million pupae can be irradiated each week.



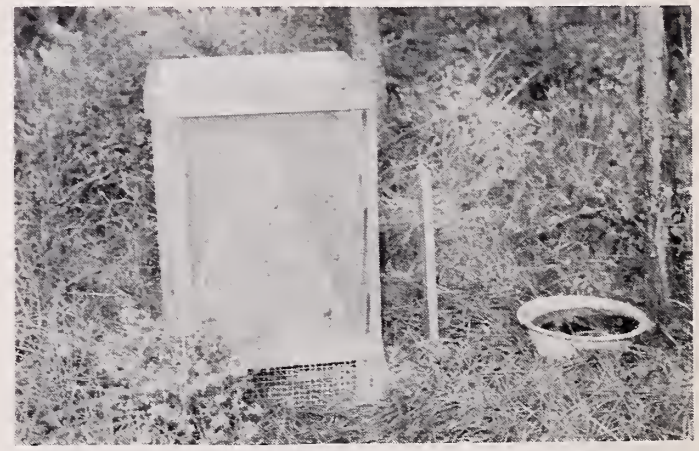
N-30226-Irradiated pupae move on conveyor belt to packaging room. Pupae are measured automatically into each box, boxes are closed mechanically, placed on trays, and then moved to holding room for flies to emerge.

N-30221-About 1,000 cartons of flies are loaded on a plane. Plane is manned by a pilot and a man who feeds boxes into automatic releasing device and checks on its operation.

N-28349-Release rate of about 50 million flies a week requires 20 light planes flying about 5 to 6 hours daily. The planes leave from 4 to 6 dispersal centers and follow a pre-determined flight pattern. (Note box of flies released from plane in upper left.)

N-22044-Eggs and larvae collected from screw-worm-infested animals help to determine the number of sterile flies to be released in a given area. Livestock owners cooperate by reporting infestations in their herds.

N-21999-Entomologist examines egg masses from infested animals to determine whether eggs are fertile. Progress of eradication program is measured by reduction of fertile egg masses collected, among other methods.



N-24719-Specially designed traps baited with meat also provide a check as to activity of native and sterile flies. Each week inspectors patrol a line of 400 fly traps.

N-30264-To prevent spread of infestation northward livestock are treated with an insecticide before they may pass a State quarantine line across the northern part of the Florida peninsula. At Federal inspection stations on the eastern borders of Louisiana and Arkansas animals are inspected, wounds are treated with smear, or an insecticide is applied before they enter the southeastern screwworm eradication area.